

AMENDMENTS TO THE CLAIMS

1-26. (Cancel)

27. (Currently amended) ~~An apparatus~~ A method for achieving a desired dose distribution comprising:

~~image obtaining means arranged to obtain~~ at least one treatment planning image from a patient to determine the relative location of target and sensitive structures;

~~treatment preparation means arranged to prepare~~ preparing a treatment plan for the patient based on the at least one treatment planning image, the treatment plan including a planned dose distribution;

~~image obtaining means arranged to obtain~~ at least one image from the patient in substantially a treatment position, the image being adequate for dose calculations; and

~~adjustment means arranged to adjust~~ adjusting how the dose is received by the patient.

28. (Currently amended) The ~~apparatus~~ method of claim 27 further comprising ~~dose distribution means configured to generate~~ generating a planned dose distribution for the patient based on the treatment plan.

29. (Currently amended) The ~~apparatus~~ method of claim 27 further comprising ~~dose distribution repositioning means arranged to reposition~~ the dose distribution for the patient based on the at least one image of the patient acquired at the time of treatment delivery.

30. (Currently amended) The ~~apparatus~~ method of claim 27 further comprising ~~treatment modification means configured to modify~~ modifying the treatment plan and the dose distribution.

31. (Currently amended) The ~~apparatus~~ method of claim 27 further comprising ~~patient position adjustment means configured to adjust~~ adjusting patient position to better position patient's internal anatomy relative to the dose distribution.

32. (Currently amended) The ~~apparatus~~ method of claim 28, wherein generating the dose distribution ~~means-generates~~ includes generating a dose distribution based on the at least one image acquired from the patient at the time of treatment delivery.

33. (Currently amended) The ~~apparatus~~ method of claim 27, wherein the dose distribution is modified to take into account changes in patient position and/or changes in patient anatomy.

34. (Currently amended) The ~~apparatus~~ method of claim 27, further comprising ~~plan selection means for~~ selecting a treatment plan from a plurality of preexisting plans for the patient based on the image acquired from the patient at the time of treatment delivery.

35. (Currently amended) The ~~apparatus~~ method of claim 34, wherein multiple plans created with objective functions are used for treatment delivery.

36. (Currently amended) The ~~apparatus~~ method of claim 27, wherein objective functions and weightings are adjusted to fine-tune treatment delivery.

37. (Currently amended) The ~~apparatus~~ method of claim 27, wherein objective function weights are learned ~~by the apparatus~~ based upon user training.

38. (Currently amended) The ~~apparatus~~ method of claim 27, wherein results are utilized either by moving the patient, modifying the delivery, or some combination of the two.

39. (Currently amended) The ~~apparatus~~ method of claim 27, further comprising ~~contour means for~~ generating contours by one of manual contouring, automated contouring, deformable fusion, template-based automatic contouring, and a combination thereof.

40. (Currently amended) The ~~apparatus~~ method of claim 27, wherein adjusting how the dose is received by the patient includes repositioning ~~the adjustment means repositions the patient to improve the dose distribution.~~

41. (Currently amended) The ~~apparatus~~ method of claim 27, wherein the images of the patient are obtained using ~~image obtaining means includes~~ one of non-quantitative CT, MRI, PET, SPECT, ultrasound, transmission imaging, fluoroscopy, and RF-based localization.

42. (Currently amended) The ~~apparatus~~ method of claim 38, wherein the treatment plan includes initially available images and related treatment plans and images obtained subsequent to initial planning.

43. (Currently amended) The ~~apparatus~~ method of claim 27, wherein ~~the adjustment means utilizes adjusting how the dose is received by the patient includes utilizing~~ one of image information, contour information, dose-volume histograms, and dosimetric information to reposition the patient.

44. (New) A method of delivering radiation therapy, the method comprising:
acquiring a first image of a region of interest in a patient;
generating a plurality of radiation treatment plans for the patient based on the first image;
acquiring a second image of the region of interest while the patient is in substantially a treatment position, the second image being at least three-dimensional; and
selecting one of the radiation treatment plans based at least in part on dosimetric information from the second image.

45. (New) The method of claim 44 further comprising generating a different radiation treatment plan based on a different position of the region of interest than the position of the region of interest in the first image and the second image.

46. (New) The method of claim 44 further comprising comparing a position of the region of interest in the first image to a position of the region of interest in the second image.

47. (New) The method of claim 44 wherein each of the radiation treatment plans includes a contour defining a margin around the region of interest based on the position of the region of interest in the first image.

48. (New) The method of claim 44 wherein the second image is adequate for dose calculations.

50. (New) A method of delivering radiation therapy, the method comprising:
acquiring a first image of a patient;
generating a radiation treatment plan for the patient, the radiation treatment plan based on the first image;
acquiring a second image of the patient substantially in a treatment position, the second image being suitable for three-dimensional contouring;

generating a contour on the second image; and
identifying a patient position with respect to a radiation delivery device based on dosimetric information and the contour.

51. (New) The method of claim 50 wherein the second image is suitable for dose calculations.

52. (New) The method of claim 51 wherein identifying a patient position is further based on the dose calculations.

53. (New) The method of claim 50 further comprising generating a plurality of treatment plans based at least in part on the first image.

54. (New) The method of claim 53 further comprising selecting one of the treatment plans for delivery to the patient, the selected treatment plan based on a desired patient position.

55. (New) The method of claim 50 wherein the dosimetric information is from the first image.

56. (New) The method of claim 50 wherein the dosimetric information is from the second image.

57. (New) The method of claim 50 wherein the dosimetric information is from a combination of the first image and the second image.